

Claim Amendments

This listing of claims replaces all prior listings:

1. (Currently Amended) A method of IR correction for use in an ECMP cell having, within an electrolyte, at least a working electrode, a counter electrode, and a reference electrode adjacent to the working electrode, wherein the voltage between the working and reference electrodes is maintained by a potentiostat having a controlled input and having its output modified by a current limiter, the method comprising:

deriving a substantially square step function test signal by applying a small square step function voltage perturbation to the potentiostat input and clipping the current of the potentiostat output resulting from the application of the small square step function to the potentiostat input, using the current limiter, such that the clipped current is formed into a substantially square step function;

measuring a voltage transient between the reference electrode and the working electrode resulting from application of [[a]] the substantially square step function test signal to the ECMP cell;

deriving from the voltage transient a measure of the resistive impedance of the ECMP circuit between and including the working electrode and the reference electrode; and

subsequently using the measure of resistive impedance to derive an IR correction to the measured voltage between the working electrode and the reference electrode.

2. (Original) The method of claim 1, further comprising using the IR correction to produce a corrected voltage that represents the voltage across a substantially capacitive interface between the working electrode and the electrolyte.

3. (Cancelled)

4. (Original) The method of claim 1, wherein the step of deriving a measure of the resistive impedance of the ECMP circuit comprises converting the voltage transient to a digital representation thereof and deriving from the digital representation a measure of the resistive impedance of the ECMP circuit.

5. (Original) The method according to claim 2, further comprising using the measure of resistive impedance to control the voltage between the working electrode and the reference electrode such that the voltage across the substantially capacitive interface between the working electrode and the electrolyte is controlled to within a substantially small variance from a predetermined target value.
6. (Original) The method according to claim 5, wherein the substantially small variance is less than about 10 mv.
7. (Original) The method according to claim 1, wherein the step of measuring a voltage transient between the reference electrode and the working electrode comprises measuring the voltage between the reference electrode and the working electrode prior to, during, and after the transient.
8. (Original) The method of claim 7, wherein measurements before and after the transient are taken with a lower temporal resolution than measurements taken during the transient.
9. (Original) The method of claim 7, wherein measurements before and after the transient are taken at substantially the same temporal resolution as measurements taken during the transient.
10. (Cancelled)
11. (Cancelled)
12. (Cancelled)
13. (Cancelled)
14. (Cancelled)
15. (Cancelled)

16. (Cancelled)

17. (Cancelled)

18. (Cancelled)

19. (Cancelled)

20. (Cancelled)

21. (Cancelled)

22. (Cancelled)

23. (Currently Amended) A method of IR correction for use in an electrochemical cell having, within an electrolyte, at least a working electrode, a counter electrode, and a reference electrode adjacent to the working electrode, wherein the voltage between the working and reference electrodes is maintained by a potentiostat having a controlled input and having its output modified by a current limiter, the method comprising:

applying a substantially square step function test signal to the electrochemical cell, wherein the substantially square step function test signal is derived by applying a small square step function voltage perturbation to the potentiostat input and clipping the resulting current of the potentiostat output, using the current limiter, such that the clipped current is formed into a substantially square step function;

measuring a voltage transient between the reference electrode and the working electrode resulting from the application of the test signal, the test signal having a start point, wherein the measurement of the voltage transient comprises measuring the voltage between the reference electrode and the working electrode at three times prior to the test signal start point and at three times subsequent to the test signal start point; deriving an extrapolated time-based voltage curve based on the measurements taken subsequent to the test signal start point;

deriving from the time-based voltage curve a measure of the resistive impedance of the electrochemical cell circuit between and including the working electrode and the reference electrode; and

subsequently using the measure of resistive impedance to derive an IR correction to the measured voltage between the working electrode and the reference electrode.

24. (Original) The method of claim 23, further comprising using the IR correction to produce a corrected voltage that represents the voltage across a substantially capacitive interface between the working electrode and the electrolyte.

25. (Cancelled)

26. (Original) The method according to claim 24, further comprising controlling the voltage between the working electrode and the reference electrode such that the voltage across the substantially capacitive interface between the working electrode and the electrolyte is controlled to within a substantially small variance from a predetermined target value.

27. (Original) The method according to claim 26, wherein the substantially small variance is less than about 10 mv.